

# PATENT SPECIFICATION

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## COMPLETE SPECIFICATION

### Improvements relating to Glass

We, PILKINGTON BROTHERS LIMITED, of 277—283, Martins Bank Building, Water Street, Liverpool, 2, Lancashire, a British Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a glass composition which is particularly suitable for the manufacture of glass fibres by the method disclosed in Complete Specification of Patent No. 428,720.

For the production of fine fibres (of the order of 3 microns diameter) by this method a composition having a very low viscosity (approximately 20 poises) at working temperature is necessary, and as is known normal glasses have a viscosity of approximately 100 poises at temperatures of 1450° to 1500° C.

A glass composition according to the invention comprises by weight 45—55% silicon dioxide, 22.1—30% calcium oxide, 10.1—20% magnesium oxide and 5—15% aluminium oxide, the balance if any consisting of other compatible constituents.

With high silica, and particularly with high total silica and alumina the viscosity characteristics are unsuitable for the purpose specified.

With low silica and high lime, glass formation is limited and difficulties due to devitrification are encountered.

The introduction of magnesium oxide lowers the viscosity and decreases the devitrification tendencies.

Alumina tends to increase the viscosity slightly but this can be offset by the magnesium oxide present. However, alumina lowers the liquidus temperature and gives improved surface tension characteristics. Moreover, it has been found that, to a great extent, the length of

the fibres is dependent upon the alumina content, a decrease in alumina tending to result in shorter fibres.

A composition comprising:—

SiO <sub>2</sub>	51.5%	by weight
CaO	23.5%	" "
MgO	15.0%	" "
Al <sub>2</sub> O <sub>3</sub>	10.0%	" "

has been found to provide a glass of good chemical durability, high softening point (approximately 150° C. higher than glasses from which fibres are normally drawn), good electrical resistance, and which permits of the production of both relatively long and fine fibres.

It is to be understood that in addition to the four components mentioned the glass may contain other components introduced deliberately, or as part of the raw materials used. Such other components may include, for example, barium oxide, zinc oxide, ferrous oxide, ferric oxide, boric oxide, manganous oxide, alkali oxide and colouring agents.

WHAT WE CLAIM IS:—

1. A glass composition comprising by weight 45—55% silicon dioxide, 22.1—30% calcium oxide, 10.1—20% magnesium oxide and 5—15% aluminium oxide, the balance if any consisting of other compatible constituents.

2. A glass composition particularly for the manufacture of glass fibres comprising by weight 51.5% silicon dioxide, 23.5% calcium oxide, 15% magnesium oxide and 10% aluminium oxide.

3. A glass composition as claimed in Claim 1 containing one or more of barium oxide, zinc oxide, ferrous oxide, ferric oxide, boric oxide, manganous oxide, alkali oxide and/or colouring agents introduced deliberately or as part of the raw materials used.

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